

PATENT ABSTRACTS OF JAPAN

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(54) PICTURE READER

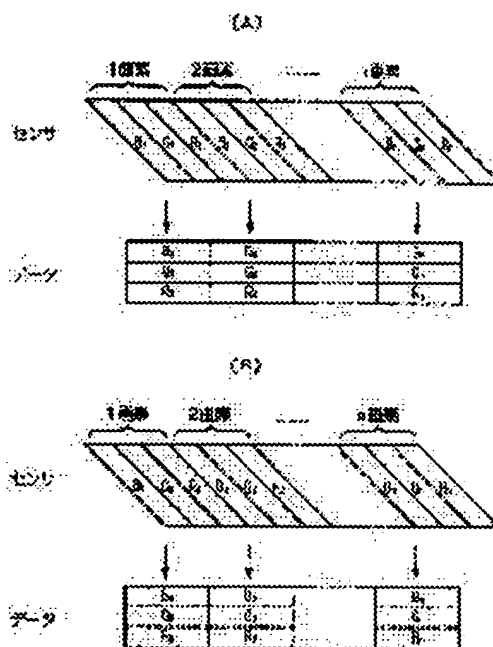
(57)Abstract:

PURPOSE: To save the waste of the reading of a picture by using the outputs of blue, green, and read light detecting CCD as picture data corresponding to each color in a color picture reading mode, and using a value obtained by adding the outputs of the three color light detecting CCD as the picture data in a black and white picture reading mode.

CONSTITUTION: At the time of reading a color picture, a charge stored in each B, G, R CCD 1, 2, and 3 is used as each B, G, and R picture data as shown in the figure.

And also, at the time of reading the black and white picture, the charge stored in each B, G, and R CCD 1, 2, and 3 is added, and the added value is used as the black and white picture data as shown in the figure B. At the

time, the amplification factor of an amplifier circuit which amplifies the CCD output is changed according to the color, so that the correction of a sensitivity can be attained. That is, the output current value of the CCD is amplified by a resistance R1 and a transistor Tr, converted into a voltage value by a container C1, and amplified by an operation amplifier OP to which a negative feedback is operated.



LEGAL STATUS

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention is equipped with three kinds of CCD, CCD for blue glow detection, CCD for green light detection, and CCD for red photodetection, and relates to the image reader which performs reading of a color picture or reading of monochrome image.

[0002]

[Description of the Prior Art] Drawing 6 expresses the configuration of a CCD line sensor. The CCD line sensor 4 reads a 1-pixel image by CCD1 for B (blue detection), CCD2 for G (green detection), and three kinds of CCD of CCD3** for R (red detection). The filter of each color of B, G, and R is actually formed in CCD, respectively. The sensor section inclines 45 degrees to a scanning direction, and it is prepared so that each CCD 1, 2, and 3 of B, G, and R may be illustrated, and he is trying for there to be no lack of image information. Although the width of face of a pixel is about 63.5 micrometers at the time for example, of 400 DPI and about 20 micrometers is strictly shifted from B in G, G, and R, this gap is satisfactory practically.

[0003] Drawing 4 is the block diagram of the control section of a CCD line sensor. The CCD line sensor 4 stores up a charge for example, in response to the manuscript reflected light. and the thing which the shift gate 5 opens to predetermined timing -- each CCD 1a, 2a, 3a, and 1b -- the amount of charges accumulated in ... is read into a shift register 6. And according to a transfer clock, the amount of charges of a shift register 6 is outputted as image data.

[0004]

[Problem(s) to be Solved by the Invention] However, although three kinds of CCD will always read an image in an image reader equipped with three kinds of above CCD when image data is read, at the time of monochrome image reading mode, only one kind of data of them was used, but two kinds of other image data was thrown away as they were. For example, although the image data of B, G, and R which were read for every pixel is used as the image data of B, the image data of G, and image data of R, respectively at the time of color picture reading mode as shown in drawing 5 (A) At the time of monochrome image reading mode, only one image data of G was used among the image data of B, G, and R which were read for every pixel, and the image data of other B and the image data of R are thrown away, and had the problem that effectiveness was bad.

[0005] The object of this invention is to offer the image reader it is made for the futility of reading of an image not to produce, when reading monochrome image using CCD for color picture reading.

[0006]

[Means for Solving the Problem] While this invention is equipped with CCD for blue glow detection, CCD for green light detection, and CCD for red photodetection At the time of a means to choose color picture reading mode or monochrome image reading mode, and color picture reading mode The output of three kinds of said CCD is made into blue image data, green image data, and red image data, respectively, and it is characterized by establishing the means which integrates the output of three kinds of said CCD, and is made into monochrome image data at the time of monochrome image

reading mode.

[0007]

[Function] The output of CCD is the accumulated dose of a charge. The accumulated dose of a charge increases, so that the light-receiving time amount of CCD is long. If there are few accumulated doses of a charge, sufficient S/N ratio cannot be obtained but the reading quality of an image will deteriorate. Here, in the conventional art in monochrome image reading mode, since only the output (charge accumulated dose) of one CCD was used as image data, in order to obtain the accumulated dose of enough charges, a certain amount of time amount is needed. However, in this invention, since the output (charge accumulated dose) of three CCD is integrated and it uses as image data, the accumulated dose of enough charges can be obtained in a short time as compared with the conventional approach.

[0008]

[Example] Drawing 1 (A) is drawing having shown the processing at the time of color picture reading in this invention, and drawing 1 (B) is drawing having shown the processing at the time of monochrome image reading.

[0009] At the time of reading of a color picture, as shown in drawing 1 (A), the charge accumulated in each CCD 1, 2, and 3 of B, G, and R is respectively used as the image data of B, the image data of G, and image data of R. Moreover, as shown in drawing 1 (B) at the time of reading of monochrome image, the charge accumulated in B, G, and R each CCD 1, 2, and 3 is added, and the aggregate value is used as monochrome image data.

[0010] Sensibility is different for every wavelength, generally the sensibility of CCD to R light is high here, and sensibility falls gradually in order of G light and B light. Therefore, since the charge accumulated dose outputted from CCD 1, 2, and 3 changes even if the quantity of light of B, G, and R is the same, this must be amended when using as image data. Then, sensibility is amended by changing the amplification factor of the amplifying circuit which amplifies a CCD output by the color. Drawing 3 shows the example of a configuration of the amplifying circuit of a CCD output. The output (current value) of CCD is amplified by resistance R1 and Transistor Tr, and is amplified with the operational amplifier OP to which it was changed into the electrical-potential-difference value by the capacitor C1, and negative feedback was applied by it.

[0011] This amplification factor is determined by variable resistance R2. The resistance of variable resistance R2 is set up for every color which connected CCD detects, and the amplification factor for every color is respectively set up by it. Thus, the sensibility to the color of CCD can be amended by changing and setting up the amplification factor of the output of CCD for every color. In addition, resistance R3 is an object for offset prevention.

[0012] the amplifying circuit shown in drawing 3 -- the output of CCD -- magnification -- and correction by sensitiveness is carried out and it is inputted into an A/D circuit. And A/D conversion is carried out, the digital value is stored as image data, and it is used for an image processing. Here, at the time of color picture reading, as shown in drawing 1 (A), the output of each CCD of B, G, and R is used as image data as it is, but as shown in drawing 1 (B), the output of CCD of B, G, and R is added at the time of monochrome image reading, and is used for it as image data. That is, while the image data of B, G, and R which were read as shown in drawing 2 is amplified by the amplifying circuit shown in

drawing 3 , sensibility is amended, and the amendment data is added. And it is stored in memory as monochrome image data, and comes to be used as image data.

[0013]

[Effect of the Invention] Since all the outputs from three kinds of CCD are used also in the time of monochrome image reading according to this invention, there is no futility of reading. Moreover, since three outputs, B, G, and R, are added, the output of each of B, G, and R may come to be small, B, G, and the charge accumulated dose of CCD of R each may be small, and it becomes enough by short-time detection.